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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/238,262	01/27/1999	JOERG SCHAEFER	10191/955	6538

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KENYON & KENYON
ONE BROADWAY
NEW YORK, NY 10004

EXAMINER

ALANKO, ANITA KAREN

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 09/30/2002

20

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Applicati n No. 09/238,262	Applicant(s) SCHAEFER ET AL.	
	Examiner Anita K Alanko	Art Unit 1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 8/12/02 amdt "d".
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 14-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 14-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

Claim Rejections - 35 USC § 112

Claims 19-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 19, line 2, “the oxide layer” lacks proper antecedent basis. In claim 20, line 20, “the passivation layer” lacks proper antecedent basis as there are two different passivation layers cited in the base claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 10, 21-24 are rejected under 35 U.S.C. 102(a) as being clearly anticipated by Pearce (U.S. Patent No. 5,711,891).

Pearce discloses a method comprising:

- providing a wafer 111 having a surface and edge areas (Fig.2);
- dividing the surface of the wafer into positive areas (unmasked and partially masked areas in figures), to be subsequently etched in a wet chemical etching process, and negative areas (masked areas) including the edge areas of the wafer (since the figures show that edges are not etched; note that edge is not clearly defined and encompasses the edge of the figure depicted in Figure 2);

- providing the negative areas with a first passivation layer 131 to protect the negative areas from a subsequent wet chemical etching process;
- providing at least one of the positive areas with a second passivation layer 132 having a thickness that is less (the figure depicts the relative thicknesses of 131 and 132) than a thickness of the first passivation layer;
- etching the wafer in the wet chemical etching process (Figures 2 and 3) to form various openings including caverns and through-holes; and
- removing the first passivation layer (Figure 1 shows that the final product uses the substrate with passivation layers removed).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 14-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Burns et al (U.S. Patent No. 5,738,757) and Perng (U.S. Patent No. 6,033,997).

Burns discloses a method comprising:

- providing a wafer 10 having a surface and edge areas (Fig. 1A);
- dividing the surface of the wafer into positive areas (unmasked and partially masked areas in figures), to be subsequently etched in a wet chemical etching process, and negative areas

(masked areas) including the edge areas of the wafer (since the figures show that edges are not etched);

- providing the negative areas with a first passivation layer (the combination of layers 12, 14, 16 and 18) to protect the negative areas from a subsequent wet chemical etching process;
- providing at least one of the positive areas with a second passivation layer (the combination of layers 12 and 14 in Figure 1B) having a thickness that is less (the figure shows that the layer formed by 12, 14, 16 and 18 is double the thickness of layer formed by 12 and 14) than a thickness of the first passivation layer;
- etching the wafer in the wet chemical etching process (col.5, line 8) to form various openings including caverns and through-holes (Fig. 1I); and
- removing the passivation layers (Fig. 1J).

Burns does not disclose providing the edge areas with a passivation layer. Perng teaches that during the processing and etching of a wafer, to protect the edges with a passivation layer 210, 270 (col.4, line 65-col.5, line 7). The layer that protects the edges is there throughout the processing to form the final product (Fig. 1), which inherently requires etching steps. Therefore, it would have been obvious to one with ordinary skill in the art to provide the edge areas with a passivation layer in the method of Burns because Perng teaches that this provides additional protection at the bead region and sides of the wafer during etching of a silicon wafer.

As to claim 15, Burns discloses to apply a nitride layer 18, and to structure the nitride layer by photolithography (col.5, lines 31-32), which encompasses using a photoresist technique. The nitride layer 18 defines a part of the surface of the wafer.

As to claim 16, Burns discloses to remove the nitride layer in subareas (where 18 is not present in Figure 1B) after the first passivation layer is provided and before the wafer is etched.

As to claims 17-18, it would have been obvious to remove photoresist after exposing and developing because it is not useful during subsequent processing of the substrate.

As to claim 19, Burns discloses that the passivation layer can comprise an oxide layer which is grown on the wafer (col.5, lines 21+). Burns does not explicitly disclose to use a LOCOS process. Examiner takes official notice that it is conventional in the art to form oxide layers by a LOCOS process. It would have been obvious to one with ordinary skill in the art to use a LOCOS process to form the oxide layer in the method of Burns because it is a conventional technique for forming oxide layers.

As to claim 20, Burns discloses that the first and second passivation layers comprise oxide.

As to claims 21-24, Burns discloses to form through hole, cavern areas and a wafer of silicon (Fig. 1J).

Claims 14-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pearce (U.S. Patent No. 5,711,891).

The discussion of Pearce from above is repeated here.

As to claims 15-18, Pearce discloses to pattern the nitride layer 133 in order to form the through-hole, but Pearce does not explicitly disclose to use a photoresist technique. It would have been obvious to one with ordinary skill to use a photoresist technique and to remove the

photoresist after exposing and developing in the method of Pearce because it is a conventional technique for patterning nitride layers.

As to claims 19-20, Pearce discloses that the oxide layer is a thermal oxide, but Pearce does not explicitly disclose to use a LOCOS process. Examiner takes official notice that it is conventional in the art to form oxide layers by a LOCOS process. It would have been obvious to one with ordinary skill in the art to use a LOCOS process to form the oxide layer in the method of Pearce because it is a conventional technique for forming oxide layers.

Response to Amendment

The 35 U.S.C. 112 rejections and the Iwasaki rejections are withdrawn. Claims 19-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 14-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Burns et al (U.S. Patent No. 5,738,757) and Perng (U.S. Patent No. 6,033,997).

Claims 10, 21-24 are rejected under 35 U.S.C. 102(a) as being clearly anticipated by Pearce (U.S. Patent No. 5,711,891).

Claims 14-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pearce (U.S. Patent No. 5,711,891).

Response to Arguments

Applicant's arguments filed 8/12/02 are persuasive with respect to the Iwasaki rejection. Applicant's arguments are not persuasive with respect to Burns, as described above. Note that

the claims are broadly written, with “comprising” language, and do not exclude the use of bilayers, or multiple layers to form the passivation layers.

Also note that the edge areas are not precisely defined to include the side edges of the wafer (as opposed to the two opposing major surface areas, the top and bottom surfaces of the wafer). “Edge” is a relative term, and “edge” of a surface of a wafer includes the edges shown in the figures.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


Paper No. 20

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anita K Alanko whose telephone number is 703-305-7708. The examiner can normally be reached on Monday-Friday, 10:00 am-4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Utech can be reached on 703-308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9057 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.


Anita K Alanko
Primary Examiner
Art Unit 1765

AKA
September 26, 2002